

DNA sequence:

cccttcatgtctttgttagaaacccatttatcttcttagggcccaatttgcaccaacccacatttttcacctaacccac
caaaggcctgcacatgttgacgtgaacacccaaactaacacgtgtcatactgccagtggatatgatgcataccat
accagagtcatagagttttgggtggaaagatttgcggatgccttcttcatttctccaactccctccaaaccc
aacaaaatgttatattagcaaagccccaagtgtaaaacgaaagttaataatccatgtgtatcgtaatttgc
gaggaagataaaaatttcaatccccatttgcattgttcatttgcattgttgcattgttgcattgttgcattgttgc

[transit peptide start]

ATGGCGCAAGTTAGCAGAATCTGCAATGGTGTGCAGAACCCATCTTATCTCCAATCTCTCGAAATCCAGTCACGC
AAATCTCCCTATCGGTTCTCTGAAGACGCAGCAGCATCCACGAGCTTATCCGATTTCTCGTCGTGGGGATTGAAGAAGA
GTGGGATGACGTTAATTGGCTCTGAGCTTCGTCTTAAGTCATGTCTCTGTTCCACGGCGAG

[mature peptide starts]

AAAGCGTCGGAGATTGTACTTCAACCCATTAGAGAAATCTCCGGTCTTATAAGCTTCTGGCTCCAAGTCTCTATCAA
TCGGATCCTGCTTCTCGCTCTGAGGTATATACCTTCGTTCTCTGTAAATCTGAACCTAGATTAT
AAAGATTGATACTTACCATTTGCTGGTTTATAGGGAAACAATGAGTGGACAACCTGTTGAATAGCGATGACATC
ATTACATGCTTGATGCGTTGAAGAGATGGGACTTAATGTTGAAACTGACAGTAAAATAATCTGTGTAGTTGAAGG
ATGTTGGGGGATATTCCAGCTTCATAGATTCAAAGAGTGAATATCGAACCTTACCTCGGTAAATGCCAGGAACAGCAATGC
GTCCACTTACCGCTGCCGTACTGCTGCAGGTGAAACGCAAGGTAGATTGAAGGAGTTGATGCTTCTGGTATTTGATG
TTAAGGAATGGAGCTTTGTTGATGCTTATGATCCATTATTCCAGTTATGCTGTTGATGGGTGCTGTTGATGAGAG
AAAGACCTATACGGGATTGGGTTGGCTTAAGCAGCTTGGCTGATGTTGAATGACTCTTGGAACTAACTGCC
CCTGTTGCTCAACGCTAATGGGCCCTCCCCGGTGGAAAGGTTAGATCTGCAATGGCATGTGAATATGAAATCTCG
TTCCCTACTATGAACACTTGCAGAACATGGATTGGTGTTCATCATGCTTAGCTGACAGATTTCAGTTTTAAATCTACTC
TCAACGGATGGATCCTAAAATAGAATCGGATTGGTGTTCATCATGCTTAGCTGACAGATTTCGGTGTATGATTCT
TGATTAACAAATTAGGAGACATGTTATGCAATTGCAAGCTGATGTTGAATGACTCTGACTGCTCT
GCTCATGTCGCTCCCTAGCTCTGGAGACGTCGAGATTGCAAAATTAAATTCTGTTCCATATGTTGAAA
TGACATTGAAGTTGATGGAAACGTTGGGGTTAGTGTGAGCATAGTGAATAGCTGGATCTGGTCTTGTCAACCCCC
CAAAATACAACAGTAGGAGTTATTCTTCTTCTGAAATCACATCCCTTAGCTGACAAATATAATGACTAAAGG
TGAATGATTGAGGTCTCCGGGTTAGCGTATGAGGGTGTGCTGTTGATGCTTAGTGTATTTCTGGCTGGTGTGCC
TTACGGTGAACACTGTCAACAGTCGAAGGTTGTGAAACTACCAAGCTTGCAGGTAAATTGTAACACTGAATCATGACGAG
GCTGTTAAGTTATAGTGAATTCTGCTAGGTCAAAGTTCATCTTGTACAAGTTGATATAACATATTGCAAGATTC
TAAGCTCAATTGGTGTGATGAATCTAGGGAGATGTAACATTGCGAGGTCTTGAGAAATGGGATGTAAGGTG
TGGACAGAGAACAGTGTGACTGTGACAGGACCACCTAGAGATGCTTTGGAAATGAGACACTTGCGGGCTATTGATGTC
CATGAACAAAATGCGCTGATGTGAGCCATGACCCCTTGCCTGCTCTTTGCTGACGGTCAACCCACCAATTAGAGATG
GTAAGTAAAAGCTCTCTTATAATTAGGTTCTCAATATTGATCACTTAATTCTGTTGGTTAATATAGGGCT
AGCTGGAGAGTAAAGGAGACAGAAAGGATGATTGCCATTGCAAGAGCTTAGAAAAGTAAGAGATTCTTATCTCT
TTCTGTCCTTGACAGTGTGCTCATTCTAAGTAATTAGCTCATAAATTGTTGTTGTTGCTGAGCTGGGAGCTACAGTGG
AGAAGGTTCAGATTATTGTTGATGAACTCCGCCAAAAGGTGAAACCGCAGAGATTGATACATATGATGATCATAGAA
TGGCAATGGCATTCTCTTGCAGCTTGTGCTGATGTTCCAATCACCACCAACGACTCTGGTTGCACCAGGAAAACCTTC
CCCGACTACTTCAAGTACTTGAAGAATCACAAAGCACTAAacaataaaactctgttttcttgcattcaagtt

FIG. 1A

Protein sequence:

MAQVSRICNGVQNPSLISNL SKSSQRKSPLSVSLKTOQHPRAYPISSWGLKKSGMTLIGSELRPLKVMSSVSTAE
KASEIVLQPIREISGLIKLPGSKSLSNRILLLAALSEGTTVVVDNLLNSDDINYM DALKRLGLNVETDSENNRAVV
EGCGGIFPASIDSKSDIELYLGNAGTAMRPLTAAVTAAGGNASYVLDGVPRMRERPIGDLVVGLKQLGADVECTLG
TNCPVVRVNANGGLPGGKVKLGSISQQYLTALIMSAPLALGDVEIEIVDKLISVPYVEMTLKLMERFGVSVEHSD
SWDRFFVKGGQKYKSPGNAYVEGDASSACYFLAGAATGETVTVEGC GTTSLQGDVKFAEVLEKGCKVWTENSV
TVTGPPRDAFGMRHLRAIDVN MNKMPDVAMTLAVVALFADGPTTIRDVASWRVKETERMIACTELRKLGATVEEG
SDYCVITPPKKVKTAEIDTYDDHRMAMAFSLAACADV PITINDSGCTRKTFPDYFQVLERITKH

FIG. 1B

Arabidopsis thaliana wild type sequence:

Position	173	174	175	176	177	178	179	180	181	182	183
	L	G	N	A	G	T	A	M	R	P	L
	CTC	GGT	AAT	GCA	GGA	ACA	GCA	ATG	CGT	CCA	CTT

Arabidopsis thaliana mutant sequences:

Name	CTC	GGT	AAT	GCA	GCA	ACA	GCA	ATG	CGT	CCA	CTT
A₁₇₇	L	G	N	A	A	T	A	M	R	P	L
I₁₇₈	CTC	GGT	AAT	GCA	GGA	ATA	GCA	ATG	CGT	CCA	CTT
	L	G	N	A	G	I	A	M	R	P	L
A₁₇₇I₁₇₈	CTC	GGT	AAT	GCA	GCA	ATA	GCA	ATG	CGT	CCA	CTT
	L	G	N	A	A	I	A	M	R	P	L
I₁₇₈S₁₈₂	CTC	GGT	AAT	GCA	GGA	ATA	GCA	ATG	CGT	TCA	CTT
	L	G	N	A	G	I	A	M	R	S	L
A₁₇₇S₁₈₂	CTC	GGT	AAT	GCA	GCA	ACA	GCA	ATG	CGT	TCA	CTT
	L	G	N	A	A	T	A	M	R	S	L
A₁₇₇I₁₇₈S₁₈₂	CTC	GGT	AAT	GCA	GCA	ATA	GCA	ATG	CGT	TCA	CTT
	L	G	N	A	A	I	A	M	R	S	L
V₁₇₈S₁₈₂	CTC	GGT	AAT	GCA	GGA	GTA	GCA	ATG	CGT	TCA	CTT
	L	G	N	A	G	V	A	M	R	S	L
L₁₇₈S₁₈₂	CTC	GGT	AAT	GCA	GGA	TTA	GCA	ATG	CGT	TCA	CTT
	L	G	N	A	G	L	A	M	R	S	L
A₁₇₇V₁₇₈	CTC	GGT	AAT	GCA	GCA	GTA	GCA	ATG	CGT	CCA	CTT
	L	G	N	A	A	V	A	M	R	P	L
A₁₇₇L₁₇₈	CTC	GGT	AAT	GCA	GCA	TTA	GTA	ATG	CGT	CCA	CTT
	L	G	N	A	A	L	A	M	R	P	L

FIG. 2

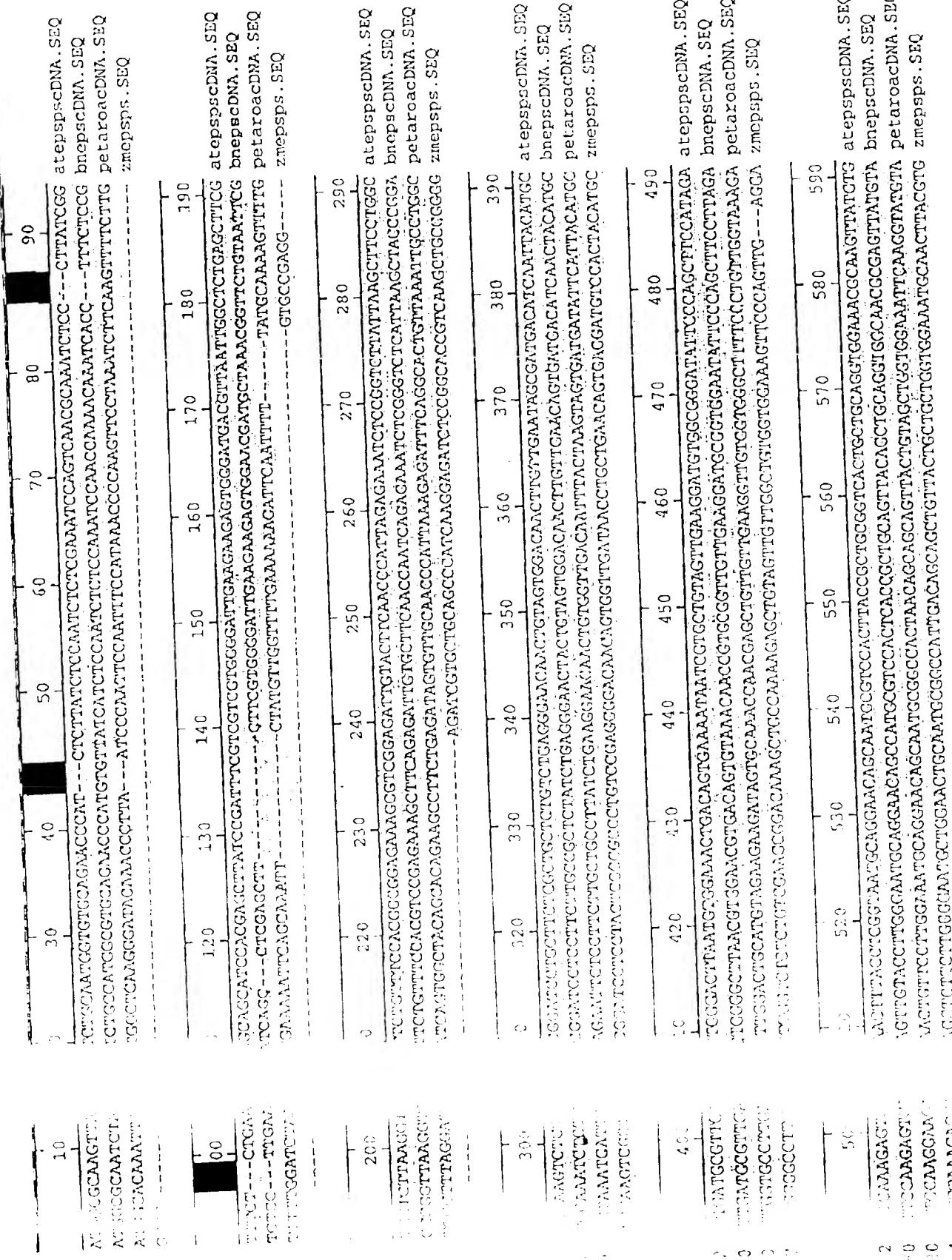


FIG. 3A

FIG. 3B

12.0	1220	1230	1240	1250	1260	1270	1280	1290
12.1	1230	1240	1250	1260	1270	1280	1290	1290
12.2	1240	1250	1260	1270	1280	1290	1290	1290
12.3	1250	1260	1270	1280	1290	1290	1290	1290
12.4	1260	1270	1280	1290	1290	1290	1290	1290
12.5	1270	1280	1290	1290	1290	1290	1290	1290
12.6	1280	1290	1290	1290	1290	1290	1290	1290
12.7	1290	1290	1290	1290	1290	1290	1290	1290
12.8	1300	1310	1320	1330	1340	1350	1360	1370
12.9	1310	1320	1330	1340	1350	1360	1370	1380
13.0	1320	1330	1340	1350	1360	1370	1380	1390
13.1	1330	1340	1350	1360	1370	1380	1390	1390
13.2	1340	1350	1360	1370	1380	1390	1390	1390
13.3	1350	1360	1370	1380	1390	1390	1390	1390
13.4	1360	1370	1380	1390	1390	1390	1390	1390
13.5	1370	1380	1390	1390	1390	1390	1390	1390
13.6	1380	1390	1390	1390	1390	1390	1390	1390
13.7	1390	1390	1390	1390	1390	1390	1390	1390
13.8	1400	1410	1420	1430	1440	1450	1460	1470
13.9	1410	1420	1430	1440	1450	1460	1470	1480
14.0	1420	1430	1440	1450	1460	1470	1480	1490
14.1	1430	1440	1450	1460	1470	1480	1490	1490
14.2	1440	1450	1460	1470	1480	1490	1490	1490
14.3	1450	1460	1470	1480	1490	1490	1490	1490
14.4	1460	1470	1480	1490	1490	1490	1490	1490
14.5	1470	1480	1490	1490	1490	1490	1490	1490
14.6	1480	1490	1490	1490	1490	1490	1490	1490
14.7	1490	1490	1490	1490	1490	1490	1490	1490
14.8	1500	1510	1520	1530	1540	1550	1560	1570
14.9	1510	1520	1530	1540	1550	1560	1570	1570
15.0	1520	1530	1540	1550	1560	1570	1570	1570

FIG. 3C

FIG. 4

10 20 30 40 50 60 70 80 90 100
NLSKSSQRKSPLSVSLXKTOQHPRAYPISSWGLKKSGMTLIGSELR-----PLKVNSSVSTAERKASEIVLQPIREISGLIKLPGSKSLSN atepsps . PRO
MLKXQNKSPDSVSIXTHQ-----PRASSWGLKKSGTMLNGSVIR-----PVKUTASYSTSEKASETVLQPIREISGLIKLPGSKSLSN bnepsps . PRO
NEHKPQPKSSSELVEGSKK-----LKNSA-----NSMVLVKKDSIFMQKFCFSRISASVATQKPSETVLQPIKEISGTVKLPGSKSLSN petaroa . PRO
NEHKPQPKSSSELVEGSKK-----AEETVLQPIKEISGTVKLPGSKSLSN zmepsps . PRO

110 130 140 150 160 170 180 190 200 210
.NSDDINNMILDALKRLGLNVETDSENRAVEGGGLFPASIDSKSDIELEYLGAGMAMRPLTAATVAAGGNAASYVLDGVPRMRERPIODLY atepsps . PRO
.MSDDINNMILDALKRLGLNVERDSVNRAVEGGGLFPASIDSKSDIEYLGLAGMAMRPLTAATVAAGGNAASYVLDGVPRMRERPIODLY bnepsps . PRO
.SSDCDINNMIGALKTLGLHVVEOSANQRAVEGGGLFPVGKESKLEIQFLGAGTAMRPLTAATVAGGNSRYVLDGVPRMRERPIODLY petaroa . PRO
.MSDOVNMILGALRPLGLSYEADKAANKRAVVNGGGKFV~-EDAKEVQULFNGAGTAMRPLTAATVAAGGNAASYVLDGVPRMRERPIODLY zmepsps . PRO

220 240 250 260 270 280 290 300 310 320
.PVYRNANGGLPGCKVKGSSISQQYLTAIIMSNPLALGDVTEIEVDKLISVPYVENTLKLMERGVSVHSWDREFVKCGQKXSGVNA atepsps . PRO
.PVYRNANGGLPGCKVKGSSISQQYLTAIIMSNPLALGDVTEIEVDKLISVPYVENTLKLMERGVSAEHSWSMDREFVKCGQKXSGVNA bnepsps . PRO
.PVYRNANGGLPGCKVKGSSISQQYLTAIIMSNPLALGDVTEIEVDKLISVPYVENTLKLMERGEGISVEHSSWSMDREFVKCGQKXSGVKA petaroa . PRO
.PVYRNANGGLPGCKVKGSSISQQYLTAIIMSNPLALGDVTEIEVDKLISVPYVENTLKLMERGVKAELISDSDVDRFYIKSGQKXSGVNA zmepsps . PRO

330 350 360 370 380 390 400 410 420 430
.GETVTVEGGTTSLQGDVKFAEMLEKMGCKVSVTENSVTGPRDAFGMRHLRAIDVMMNKHDIDVANTLAVVVALFDGPTAIRDVASWRV atepsps . PRO
.GETVTVEGGTTSLQGDVKFAEVLEKMGCKVSVTENSVTGPRDAFGMRHLRAIDVMMNKHDIDVANTLAVVVALFDGPTAIRDVASWRV bnepsps . PRO
.GETVTVEGGTTSLQGDVKFAEVLEKMGAEVNTENSVTGPRSSSGRKHLRAIDVMMNKHDIDVANTLAVVVALFDGPTAIRDVASWRV petaroa . PRO
.GETVTVEGGTTSLQGDVKFAEVLEKMGAKYWTETSVTGPRPFGRHLKAIDVMMNKHDIDVANTLAVVVALFDGPTAIRDVASWRV zmepsps . PRO

440 460 470 480 490 500 510 520
.TVBEGSDYCVITPPKVKTAELDTDDHRMANAFSLAACADVPITINDSGCTRKTFPDYFQVLERITKH atepsps . PRO
.TVBEGSDYCVITPPKVKPAEIDTYDDHRMANAFSLAACADVPITINDSGCTRKTFPDYFQVLESITKH bnepsps . PRO
.TVBEGSDYCVITPPKVKPAEIDTYDDHRMANAFSLAACADVPITINDSGCTRKTFPDYFQVLESITKH petaroa . PRO
.TVBEGSDYCVITPPKVKPAEIDTYDDHRMANAFSLAACADVPITINDSGCTRKTFPDYFQVLESITKH zmepsps . PRO

Oligo Name Oligo Sequence (5' → 3')

ATEPS-A₁₇₇

CGTTTCCACCTGCAGCAGTGAACGGCAGCGGTAAGTGGACGCATTGCTGTGCATTACCGAG

ATEPS-AI

CGTTTCCACCTGCAGCAGTGAACGGCAGCGGTAAGTGGACGCATTGCTGTGCATTACCGAG

ATEPS-IS

CGTTTCCACCTGCAGCAGTGAACGGCAGCGGTAAGTGGACGCATTGCTGTGCATTACCGAG

ATEPS-AS

CGTTTCCACCTGCAGCAGTGAACGGCAGCGGTAAGTGGACGCATTGCTGTGCATTACCGAG

ATEPS-AIS

CGTTTCCACCTGCAGCAGTGAACGGCAGCGGTAAGTGGACGCATTGCTGTGCATTACCGAG

ATEPS-I₁₇₇

CGTTTCCACCTGCAGCAGTGAACGGCAGCGGTAAGTGGACGCATTGCTGTGCATTACCGAG

ATEPS-VS

CGTTTCCACCTGCAGCAGTGAACGGCAGCGGTAAGTGGACGCATTGCTACTCCGCATTACCGAG

ATEPS-LS

CGTTTCCACCTGCAGCAGTGAACGGCAGCGGTAAGTGGACGCATTGCTACTCCGCATTACCGAG

ATEPS-AV

CGTTTCCACCTGCAGCAGTGAACGGCAGCGGTAAGTGGACGCATTGCTACTCCGCATTACCGAG

ATEPS-AL

CGTTTCCACCTGCAGCAGTGAACGGCAGCGGTAAGTGGACGCATTGCTACTCCGCATTACCGAG

FIG. 5

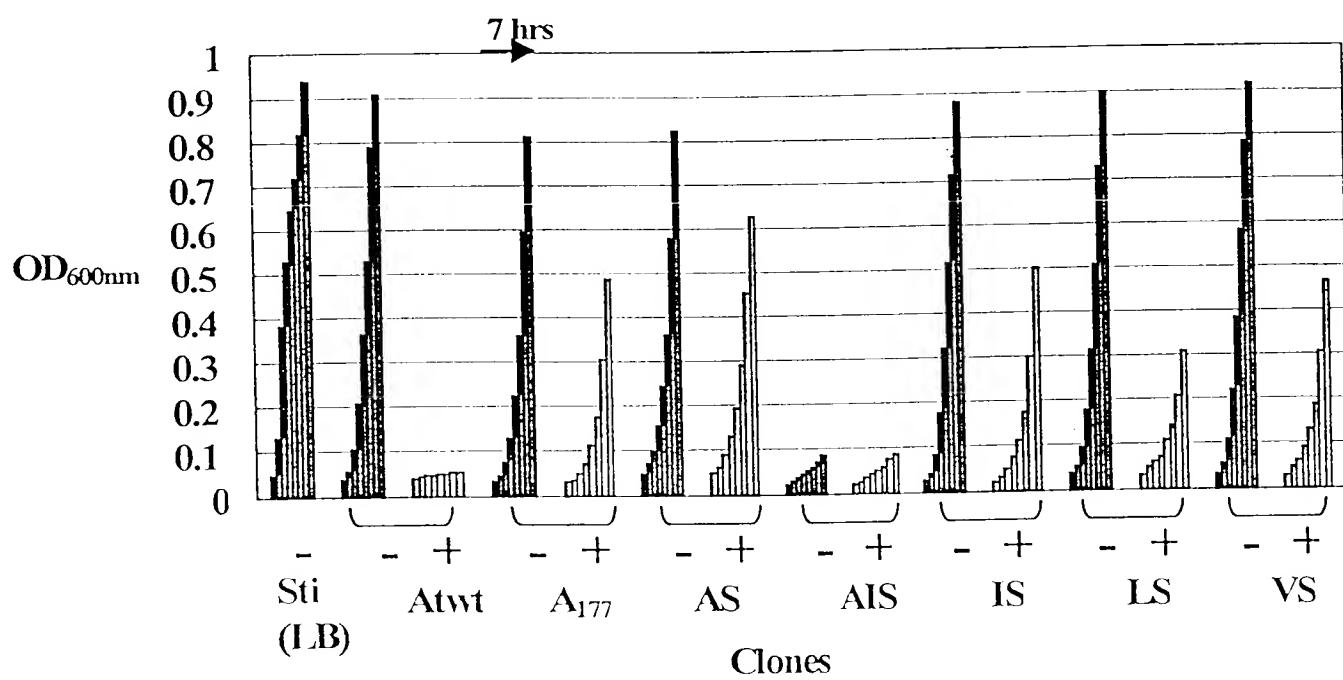


FIG. 6

Arabidopsis clones

Bacillus

L E

AS

L E

WT

L E

Salmonella

L E

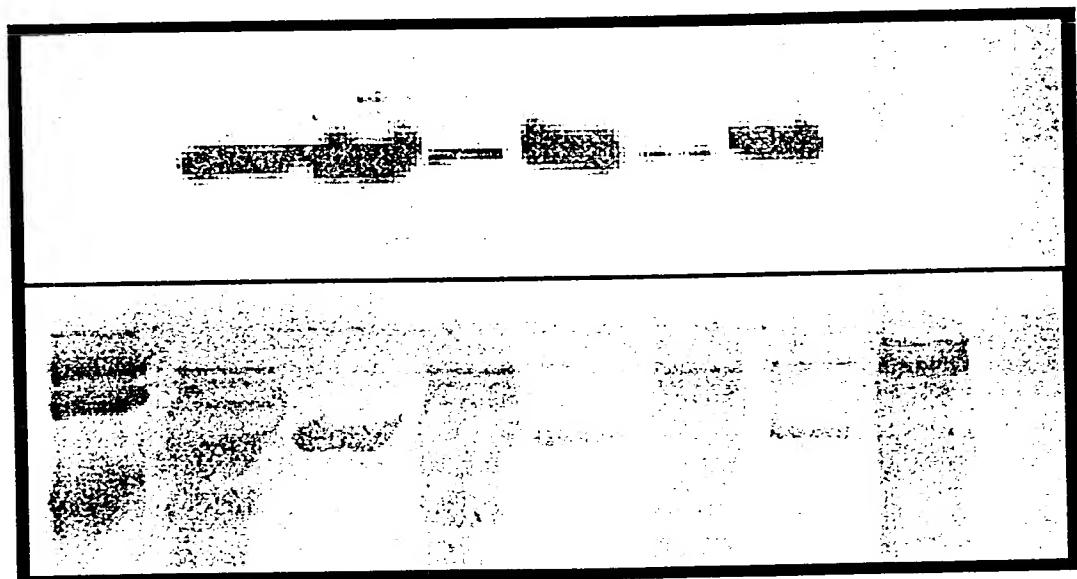


FIG. 7